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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,692	12/11/2003	Philip Stashenko	25669-003	4324

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EXAMINER	
CHANDRA, GYAN	
ART UNIT	PAPER NUMBER
1646	

MAIL DATE	DELIVERY MODE
06/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/734,692	STASHENKO ET AL.	
	Examiner	Art Unit	
	GYAN CHANDRA	1646	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,26-29 and 31-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 26-29 and 31-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/17/2009 has been entered.

Status of Application, Amendments, And/Or Claims

The amendments of claim 1 have been made of record.

Claims 1, 26-29 and 31-33 are pending and under examination.

Claim Objections

Claim 1 is objected to because of the following informalities:

The Examiner suggests that syntax of claim 1 can be improved by replacing the term “activity” with the term “an activity” in line 2, because the inhibition of expression can be one of the activities of a gene product.

Appropriate correction is required.

Response to Arguments

Claim Rejections *- maintained*

Claim Rejections - 35 USC § 112-written description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 26-29 and 31-33 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement for the reasons of record in pg. 3-7 of the Office Action of 7/09/2007 and in pg. 3-4 of the Office Action of 3/17/2008.

Applicants argue (pg. 4 of Response) that claim 1 is amended to recite methods of inhibiting osteoclast-mediated bone resorption by administering a compound that inhibits the activity of a gene product encoded by OC14, wherein the activity is inhibited by administering a compound that inhibits the expression of said gene product. Applicants reiterate their arguments that the instant invention is not limited to a specific compound and argue that the invention is drawn to a method of inhibiting osteoclast-mediated bone resorption by inhibiting the expression of OC14 gene. Applicants argue (pg. 5 of Response) that the claimed method is described throughout the specification, e.g., at pages 1-2, and 49.

Applicants' arguments have been fully considered but they are not persuasive because the specification does not disclose any compound selected from the group consisting of a fusion protein, a polypeptide, a peptidomimetic, an antisense polynucleotide, a prodrug, an antibody, a small molecule inhibitor or a ribozyme that inhibits OC14 gene activity and leads to inhibition of osteoclast-mediated bone resorption. The instant claims are broadly drawn a method of inhibiting osteoclast-mediated bone resorption comprising administering a compound that inhibits activity of OC14. The specification on pages 1-2, and 49 discloses, in general, how one of the skill in the art could use an antibody to inhibit a protein activity or use a compound to inhibit

gene expression, wherein said inhibition can be at least 10%, 20%.....or at least 90%, but the specification does not disclose any compound selected from said group, which when administered to a subject or model inhibits said activity of OC14 of SEQ ID NO: 50 at least 10% and results in osteoclast-mediated bone resorption. Applicants' arguments that the instant invention is not limited to a specific compound and arguments that the invention is drawn to a method of inhibiting osteoclast-mediated bone resorption by inhibiting the expression of OC14 gene have been fully considered but they are not persuasive because the method is broadly drawn to inhibiting osteoclast-mediated bone resorption which is achieved by administering a compound that inhibits an activity of OC14 wherein said activity can be expression of OC14. Therefore, one of the skill in the art has to identify a compound that inhibits activity of a gene product encoded by OC14 and then has to administer such a compound to find out if said can inhibit osteoclast-mediated bone resorption. The specification fails to disclose any compound which inhibits said activity of OC14 of SEQ ID NO: 50 at least 10% that results in osteoclast-mediated bone resorption. Therefore, the rejection is maintained.

Claim Rejections - 35 USC § 112-scope of enablement

Claims 1, 26-29 and 31-33 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an antibody that could bind to a protein encoded by a product of OC14 gene, does not reasonably provide enablement for a method of inhibiting osteoclast-mediated bone resorption comprising inhibiting an

activity of a gene product encoded by OC14 gene by administering a compound that inhibits said activity by inhibiting the expression of said gene product. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to which the invention commensurate in scope with these claims.

In In re Wands, 8USPQ2d, 1400 (CAFC 1988) page 1404, the factors to be considered in determining whether a disclosure would require undue experimentation include: (1) Nature of the invention, (2) the state of the prior art, (3) the predictability or lack thereof in the art, (4) the amount of direction or guidance present, (5) the presence or absence of working examples, (6) the breath of the claims, (7) the quantity of experimentation needed, (8) relative skill of those in the art.

The instant disclosure fails to meet the enablement requirement for the following reasons:

The instant claims are broadly drawn to a method of inhibiting osteoclast-mediated bone resorption comprising inhibiting activity of a gene product encoded by OC14 gene by administering a compound that inhibits the expression of said gene product and wherein the activity of said gene product is decreased by at least 10% in the presence of said compound as compared to said activity without said compound.

The state of the prior art and the predictability or lack thereof in the art: Holliday et al (J. Biol. Chem. 272: 22053-22058, 1997) teach that bone turnover is highly regulated and osteoclasts, the cells that degrade bone, require activation to trigger their bone resorption capacity (page 22053, 1st paragraph). They teach that once osteoclasts are activated, they secrete both protons and proteinases at their attachment site, resulting in dissolution of bone mineral and degradation of the matrix (page 22053). Votta et al (J. Bone and Miner. Res. 12: 1396-1406, 1997) teach that a cysteine protease, potentially

a cathepsin, plays role in the bone matrix degradation. Votta et al teach that the use of peptide aldehyde inhibitors of cathepsin K inhibit bone resorption in an isolated osteoclast resorption assay (pages 1401-1402, Inhibition of bone resorption). Similarly, Sugawara et al (Anal. Biochem. 255: 204-210, 1998) teach that osteoclasts produce bicarbonate and hydrogen ions by carbonic anhydrase II and secrete protons through proton pumps (page 209, left column). They teach that the use of a macrolide antibiotic strongly inhibits the activity of this enzyme, which results in the inhibition of bone resorption (page 209, right column). They teach that certain functional molecules of osteoclast such as H+, -ATPase, src, PI3-kinase, carbonic anhydrase, cathepsin K and αvβ3-integrin have been targets of antiosteoporotic drugs (inhibitor of bone resorption) (page 209, last paragraph). They suggest that it may be possible to find new categories of bone resorption inhibitor by random screening using their assay. However, the art does not teach any role of a product encoded by OC14 gene in osteoclast-mediated bone resorption. Therefore, one of skill in the art would have to first establish if a product encoded by OC14 gene is responsible of bone resorption and then one skilled artisan has to find a molecule which can inhibit OC14 gene expression at least by 10% that results in the inhibition of an activity of OC14 that would result in the inhibition of bone resorption. Therefore it is unpredictable and would require a large amount of experimentation to inhibit bone resorption by inhibiting an activity of OC14 encoded product and wherein inhibition of said activity is by inhibiting OC14 gene expression by administering a compound that is yet to be identified.

The amount of direction and guidance present and the presence or absence of working examples: Given the teachings found in the art, detailed teachings are required to be present in the disclosure in order to enable the skilled artisan to practice the invention as claimed. These teachings are absent. The specification pages 14-18 disclose a number of factors are responsible for osteoclast activity. On page 17, the specification discloses that M-CSF, RANKL, IL-1, FGF2 and LPS are exogenous anti-apoptotic mediators for osteoclasts. The specification, page 14, Table 1 discloses performing a differential gene expression of differentiated vs. undifferentiated cells using Affymetrix technology. Fig. 1 shows the differential expression of some genes when RAW264.7 cells are treated with RANKL. At best, this could be taken as a marker for a stimulated cell vs. non stimulated cell. The specification, page 74 discloses (example 1) a differential gene expression for identification of osteoclast markers. The specification does not disclose any example where a compound that inhibits an activity of OC14 encoded protein can inhibit bone resorption. The art or the specification is devoid of any example where a compound that inhibits OC14 gene expression results in the inhibition of bone resorption. Therefore, it is unpredictable how one of the skill in the art can practice the instantly claimed invention.

The breadth of the claims and the quantity of experimentation needed*:* Due to the large amount of experimentation necessary to establish if the inhibition of OC14 encoded protein activity would result in the inhibition of osteoclast-mediated bone resorption and then to identify a compound that would inhibit an activity of OC14 gene

encoded protein, the lack of direction/guidance presented in the specification regarding the same, the state of the prior art which establishes the unpredictability regarding the role of OC14 gene in osteroclast-medicated bone resorption, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope.

Conclusion

Claims 1, 26-29 and 31-33 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GYAN CHANDRA whose telephone number is (571)272-2922. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Nickol can be reached on (571) 272-0835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gyan Chandra/
Examiner, Art Unit 1646